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RESEARCH SUMMARY

forest sciences
NELSON FOREST REGION

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CASE STUDY: Establishing Wildlife Tree Patches in an Operational Setting

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- **Wildlife Tree Patch layout should be part of the "Total Chance Plan."**
- **Wildlife Tree Patch establishment cost $0.06 per m³ for the cutting permit**

INTRODUCTION

It has been well documented in British Columbia and throughout the Pacific Northwest that many forest-dwelling wildlife species are dependent on standing dead, diseased, and dying trees. The Forest Practices Code (FPC) of British Columbia has recently introduced guidelines requiring that wildlife tree retention objectives be specified in forest development plans and silviculture and stand management prescriptions. It is generally accepted that wildlife tree patches (a.k.a. group reserves) established prior to harvesting operations is the most effective and efficient method for protecting wildlife trees and other biodiversity components.

As part of a study on wildlife trees and cavity nesters in the Deer Creek watershed of the Arrow Forest District, wildlife tree patches were established on four experimental cutblocks, two of which were logged during winter 1995/96. Identification and layout of these patches led to the development of a detailed methodology for establishing wildlife tree patches in operational forests of the Nelson Forest Region.

While the general strategies of wildlife tree retention and biodiversity management are gaining recognition and acceptance throughout the province, little empirical information is available to guide resource managers and field personnel in implementing the strategies during forestry operations.

The objectives of Deer Creek Case Study were to describe the planning, field layout, and harvesting logistics required to establish wildlife tree patches operationally. Worker safety and costs were also noted.

Snags in the interior of Wildlife Tree Patch: one of the most critical components.

SITE

The stand is located in the mesic site series of the dry, warm Interior Cedar-Hemlock (ICHdw) biogeoclimatic subzone. This ecosystem has one of the highest diversities of wildlife tree users in the region. The stand ranges in elevation from 820 to 1,000 m and is generally south-west facing, with either flat or low to moderate slope. Dominant conifer species are seral Douglas-fir, lodgepole pine, and western larch, with a minor component of western redcedar, western hemlock, ponderosa pine, trembling aspen and paper birch. Most of the stand is mature second

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growth (85-95 years), with patches of young seral lodgepole pine and scattered veteran trees (210-225 years).

Approximately 30 years ago, the stand was selectively logged for cedar, hemlock, and Douglas-fir. The area has a natural disturbance history characterized by major fires in 1912 and 1948, a minor ground fire in 1968, mountain pine beetle at endemic levels, and widespread occurrence of Armillaria root disease and larch dwarf mistletoe.

The Deer Creek watershed is part of the operating area of Kalesnikoff Lumber Co. Ltd. of Thrums, B.C. Primary forest management objectives for C.P. 31 are to (1) harvest timber while minimizing impacts on water quality and quantity within this Licensed Domestic Watershed, (2) maintain or enhance valuable habitat features that are currently present, and (3) salvage timber volume currently being lost to mountain pine beetle and Armillaria root disease and avoid the advancement of Armillaria by species conversion within the first pass treatment units.

Together, the four experimental cutblocks, which range in size from 8.1 - 18.6 ha, have a high abundance and diversity of cavity nesters (0.7 active nests per ha in 1995 of 13 different species). This is due, at least in part, to the high density of snags present on the blocks (approximately 1/4 of all trees > 10 cm d.b.h.). This observation and the discovery of an active Northern Goshawk nest at the boundary of block 7 (Fig.1) called for the establishment of a number of sizable wildlife tree patches. From an ecological perspective, the patches were designed to protect the following habitat components:

- active nest trees and trees with sign of wildlife foraging
- trees containing ant colonies;
- snags in a variety of sizes and decay stages;
- young and mature broad-leafed deciduous trees;
- pathogen and bark beetle host trees
- live and dead vets, and
- recruitment (future) wildlife trees.

The higher level planning designation for the Deer Creek watershed set by the West Kootenay-Boundary Commission on Resources and Environment (CORE) Land Use Plan is 'Integrated Management'. Consequently, the Total Resource Plan objectives for the area integrate community watershed concerns, wildlife habitat and biodiversity maintenance requirements, and a sustainable level of timber harvest. The Equivalent Clear-cut Area (ECA) management threshold of 25% and requirements for biodiversity management guide the harvest system decision making process.

PLANNING AND LAYOUT

Based only on ecological features, some of the proposed interior patches initially interfered with the intended road and block layout. However, the layout became quite simple when the Total Chance concept was applied to the positioning of the Wildlife Tree Patches (WTPs). The first pass treatment does not alienate second and third pass opportunities and resembles a group selection harvest. Landings and spurs are positioned such that they can be used for future harvesting activities. Some of the mature healthy trees retained within WTPs can likely function as future tail holds for further accessing of timber with cable systems.

The WTPs became relatively easy to identify once engineering and reconnaissance surveys had been completed. Most WTPs had several features in common such as mixed species composition and mortality to the coniferous component. Some patches were located in areas that exhibited features similar to Riparian Management Zone criteria. Boundaries were determined on the basis of wildlife tree habitat value (e.g., active nest trees) as well as skidding and engineering considerations. In general, harvesting logistics were not significantly compromised, because most WTPs were placed adjacent to cutblock boundaries.

SAFETY CONSIDERATIONS

All snags greater than 3 m in height[1] within WTPs were assessed with respect to distance from and lean into active work areas. Hazard trees (i.e., snags located within 1.5 tree lengths of and not leaning away from work areas) were marked for removal. However, because the possible reactions of all snags within a patch to the logging operations is sometimes difficult to predict, it was left to the decision of the snag faller to remove additional hazard trees[2], for safety considerations only. In general, boundaries of WTPs were placed such that, wherever possible, the need for removal of snags within patches was minimized.

It was important to brief loggers prior to commencement of harvesting about the exact locations of WTPs and the method of marking patch boundaries. Because WTPs contain potential hazard trees, it is essential that patch boundaries are obvious and recognizable. Danger tree fallers were instructed to prefall all snags and hazard trees within reach of active work areas. It was also useful to explain the rationale for the patches and the biological features they contain.

COSTS

First pass development costs were $12.00 per cubic meter, but 80% of the accessible volume remains. This retained volume is almost fully developed (except for some minor spurs). The first pass was all conventional harvesting, but the second and third passes will include some cable systems. Development costs for the remaining volume will be minimal. Costs incurred due to the WTP establishment were $0.10 per cubic meter (or 1.5 work-days per block). This cost estimate is based on only those blocks within which WTPs were retained. The WTP establishment costs for the cutting permit as a whole were $0.06 per cubic meter (or 0.5 % of the total development costs).

[1] Note that the Workers' Compensation Board of B.C. has changed the regulation of mandatory removal of all snags greater than 3m in height during harvesting operations to snags greater than 5m in height.

[2] Note that, by policy, hazard trees felled within WTPs have to be left on the ground.

CONCLUSIONS AND RECOMMENDATIONS

The process of establishing WTPs in the Deer Creek watershed indicated that layout of WTPs is least problematic if it is part of "Total Chance Planning" for a given cutting permit. Pre-harvest surveys should be conducted to identify valuable biodiversity components as well as the best locations for WTPs from an engineering perspective.

WTPs should be marked differently than block boundaries to avoid confusion and to indicate that potential danger trees are contained within a patch. The no-work zone status of WTPs has to be clearly communicated to forest workers. In addition to marking WTP boundaries with ribbon, they should also be painted such that they remain recognizable during subsequent silviculture activities within the treatment units.

The Forest Practices Code requires that WTPs be netted out of the gross cutblock area through traversing. This will relieve licensees of silviculture obligations associated with the WTPs provided no timber is removed from a patch, including felled danger trees.

Firewood cutters, who often fell snags that have deliberately been retained, potentially undermine effective wildlife tree management. C.P. 31 is a case in point because firewood cutters removed several trees directly adjacent to the Northern Goshawk nest (block 7), potentially destroying the habitat value of this retained nest tree. We provide the following recommendations for protecting wildlife trees from firewood cutters:

1. All accessible important wildlife trees should be marked with wildlife tree signs;
2. Retained trees and wildlife tree patches should be monitored for compliance of the "do not cut" policy and noncompliance should be enforced by law; and
3. Roads should be deactivated to protect wildlife and their habitat.

Biodiversity components must be maintained throughout the entire rotation. To provide recruitment wildlife trees, live healthy trees must be retained singularly or within WTPs. Species most resilient to Armillaria (i.e., ponderosa pine and western larch) were favoured for retention and these will have habitat values throughout the rotation. This variety of residual characteristics will create opportunities for removal of future volumes within the first pass WTPs and will be advantageous for negotiating future entries. Note that WTPs are not considered permanent reserves; however, they can only be harvested if other equally or more suitable patches are present nearby.

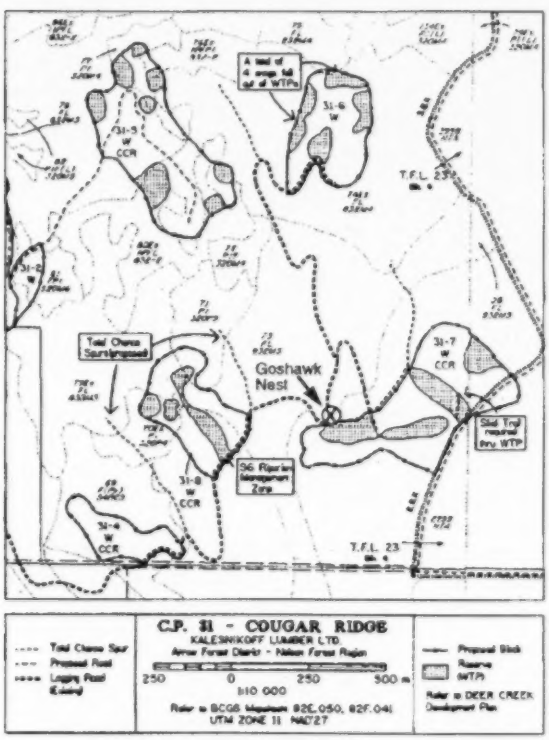

Figure 1. Map showing location of blocks, WTPs, roads, skid-trails, active cavity nests and Northern Goshawk nest.

RELEVANT PUBLICATIONS

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